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FILING DATE: *February 02, 2004*
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Certified by

Jon W. Dudas

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Customer No. 31013 **Docket No. 161485-00590**

PROVISIONAL APPLICATION FOR PATENT COVER SHEET

Mail Stop Provisional Patent Application
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

This is a request for filing a Provisional Application for Patent under 37 C.F.R. § 1.53(c).

Inventor(s) and Residence (city and either state or foreign country):

Timothy Thomson - West Newbury, Massachusetts

For **A HYDROPHILIC MATRIX FOR DELIVERY OF ACTIVE AGENT**

1. ☒ 6 sheets of specification

2. ☒ A check in the amount of $80.00 is enclosed in payment of the required fee. The Commissioner is hereby authorized to charge and additional fees or credit any overpayment to Deposit Account No. 50-0540.

3. ☒ Please direct all communications relating to this application to the address of:

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4. ☒ Applicant hereby states pursuant to 37 C.F.R. § 1.27(c)(1) that Applicant is a small entity.

5. ☒ This invention was not made by an agency of the United States Government or under a contract with an agency of the United States Government.

Dated: February 2, 2004

Respectfully submitted,

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PROVISIONAL APPLICATION FOR LETTERS PATENT

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Title: **A HYDROPHILIC MATRIX FOR DELIVERY OF ACTIVE AGENT**

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Background of the Invention

There is a need for the delivery of pharmacenticals and disinfectants to control or prevent disease. It is an important aspect that systems used for the delivery function such that a measured amount of drug or disinfectant by delivered upon each use. If the method of delivery is by diffusion out of a polymer matrix, Fick's Law predicts that the first use will result in the highest delivery rate and each successive application will deliver less of the active ingredients.

Detailed Description of the Invention

A method is described for the controlled delivery of active ingredients from a high surface area matrix by dissolution. A soluble or insoluble active ingredient is dispersed or dissolved in a soluble polymer matrix. The soluble polymer matrix is dispersed onto an open cell or reticulated polymer scaffold. The matrix dispersed onto the scaffold can be used as a flow through or wipe on applicator. The rate of delivery of the active ingredient is controlled by the rate of dissolution of the soluble polymer matrix as opposed to its diffusion.

We have discovered that controlled delivery is made more useful and an added degree of control is achieved by incorporating an active ingredient dispersed or dissolved in a soluble polymer into a complex like that taught in Thomson US Patent 6,617,014. The soluble polymer/active ingredient system can be incorporated into pure hydrophilic polyurethane by itself or in a composite on a stabilizing scaffold, e.g. hydrophobic polyurethane.

EXAMPLE 1

To study the dissolution rate from the composites of the invention a 30-liter aquarium was used for the solution studies. It was fitted with a standard lab mixer. For each experiment the tanks were filled with 25 liters of tap water. Enough NaOH was added to make

the water basic. The temperature was adjusted to 22°C but not thereafter controlled. A sample of the water was used to set a visible spectrophotometer to 100 % transmission.

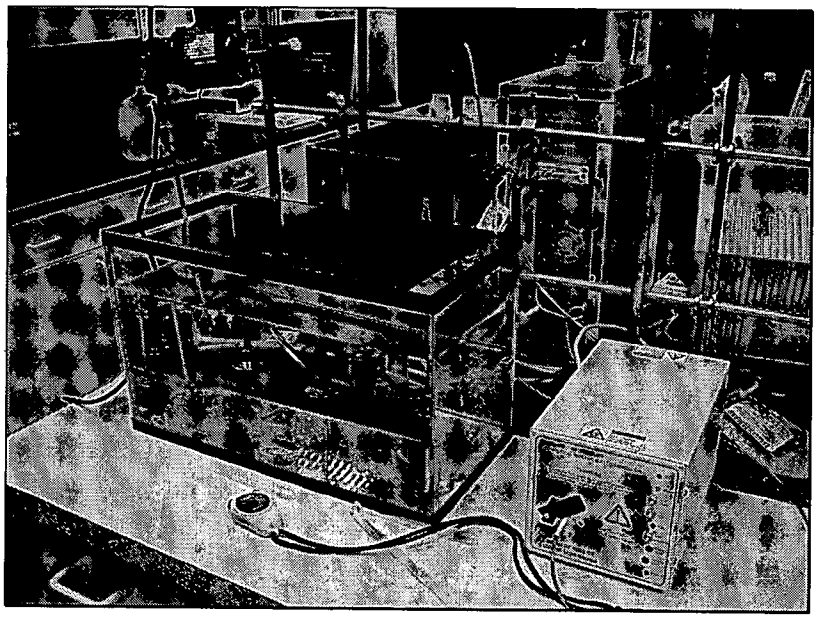


Figure 1: Dissolution Study Tank

100mg of bromothymol blue was imbibed into a piece of hydrophilic polyurethane foam, a common controlled release matrix.. After drying, the foam was placed in the test chamber and the rate of release of the dye was determined as described above. Fig 2 shows the spectral data as a function of time.

By the use of a calibration curve, these % transmission values at 617nM can be translated into mass.

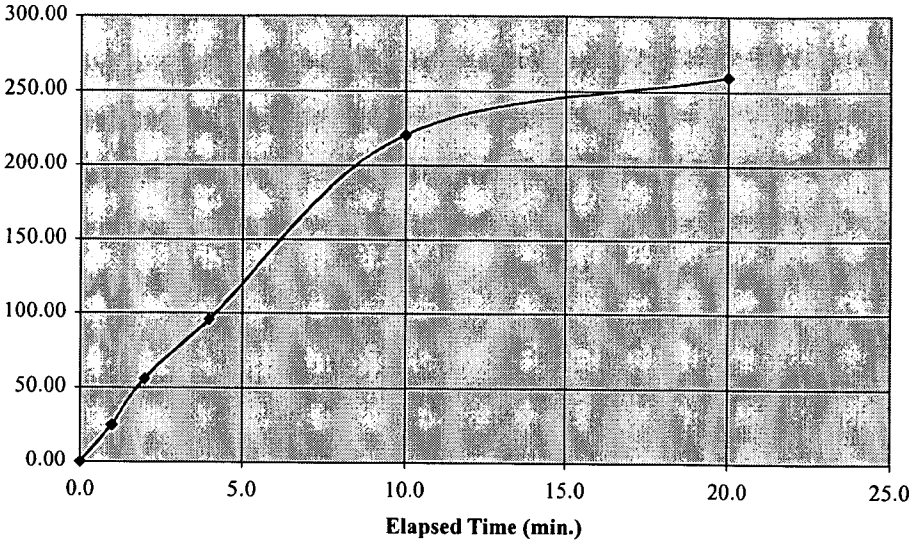


Fig 2

The rate of change of the delivery rate is seen in Fig 3.

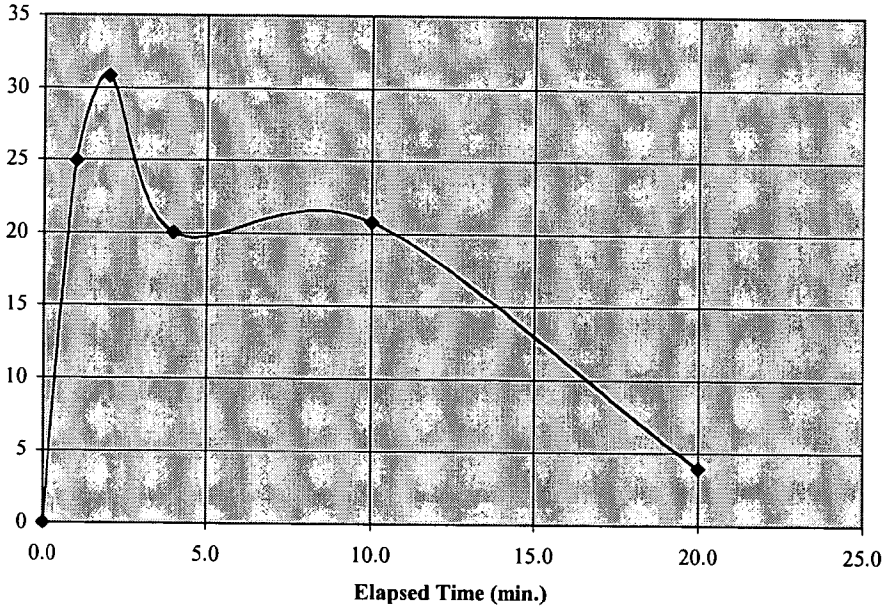


Fig 3

This a typical diffusion curve. The rate of release is a function of the concentration.

EXAMPLE 2

Five grams of each of Pluronic F87, F108 and F127 was placed in an aluminum weighing pan. 100 mg of bromothymol blue (BTB) was weighed in to each. The pans were placed in an oven at 95°C. The Pluronics all melted and the BTB was mixed to affect dissolution. The pans were taken from the oven and allowed to cool. All samples solidified.

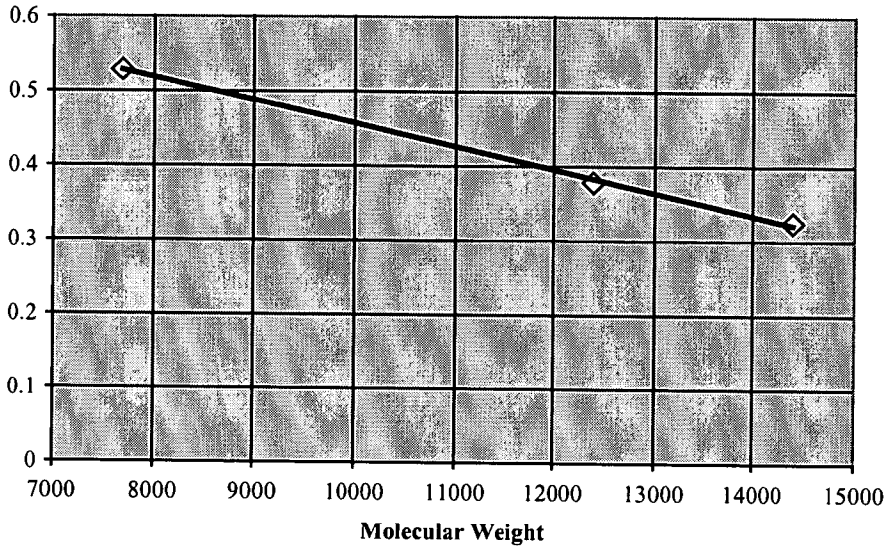
One of the Pluronic samples (still in the weighing pan) was placed in the tank and a timer started. As the Pluronic, dissolved it released the BTB which was evident by a blue color developing. The rate of increase in the intensity of the blue was monitored by determining the % transmission at 617nM using the spectrophotometer. A calibration curve was developed which allowed the calculation of the release rate.

The experiment was repeated for each of the subject Pluronics. To show the effect of this invention on the delivery pattern, BTB was dissolved in Pluronic F87 and was tested by the technique described above. The release pattern is clearly linear and this is supported by an R^2 of 0.9989. A plot of the derivative of this curve also supports the zero order hypothesis. Comparing this curve with that in Example 1, shows that thetechnique is effective in controlling the release rate. The Pluronic F87 appears capable of a uniform rate of release of 0.53 mg of BTB per minute. Diffusion from the polymer does not appear to be a contributing factor.

The other Pluronics were of higher molecular weight.

The release rates for the three polymers are summarized in the following table.

Polymer Matrix	Release Rate (mg/min.)
Pluronic F87	0.529
Pluronic F127	0.381
Pluronic F108	0.325



EXAMPLE 3

A measured amount of polyethylene glycol 1000 was incorporated into a 4"x4"x0.25" square of a composite polymer matrix as taught in US Patent 6,617,014. Several sheets of paper were marked out in a square 12" by 12". Each square was weighed on an analytical balance to 0.1 mg. The foam square was wetted and the marked off portion of a piece of paper was scrubbed. Both the paper and the foam were died and weighed. The procedure was repeated with new sheets of paper. The increase in weight of each sheet is interpreted as the amount of PEG1000 delivered by scrubbing the paper. The following figure shows that roughly an equivalent amount of PEG1000 was delivered by each application.